

07-01-'04 15:41 FROM-Lerner & Greenberg +9549251101  
Appl. No. 10/030,238  
Amdt. dated July 1, 2004  
Reply to Office action of March 1, 2004

T-174 P03/15 U-904

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended). A method for setting process parameters of a production process for an elongate sheet-like product to achieve a predeterminable quality, with the following features:

recording a plurality of process parameters of the production process as a function of time in the form of process data,

processing the process data in at least a first data processing unit and ~~output~~ outputting as production data,

observing the surface of the product by means of a surface inspection system within or at the end of the production process in a process step, the observation data being used in at least a second data processing unit to record the entire surface as a surface map with established surface features in the form of surface data and to classify the surface features according to various types and/or according to size and/or according to frequency and enter them in the surface map according to their position,

outputting the various classes and positions of surface features as product data,

feeding the production data and the product data together to at least a third data processing unit and investigating the production data and the product data there for correlations existing between them, with rules as to how the product data depend on specific production data being established,

setting the process parameters in accordance with the established rules to achieve a desired quality as a feedback to the production process.

Claim 2' (previously presented). The method as claimed in claim 1, the product being rolled steel and the production process being a rolling process, in particular a hot-rolling process in a cast-rolling installation.

Claim 3 (previously presented): The method as claimed in claim 1, the surface inspection system being an arrangement having a plurality of sensors, in particular cameras, with downstream image analysis systems.

Claim 4 (previously presented). The method as claimed in claim 1, the investigation for correlations between production data and product data being in particular a correlation program, which considers the entropy in the data space and detects correlations by finding data constellations with minimal entropy.

Claim 5 (previously presented). The method as claimed in claim 1, the surface inspection system analyzing the surface data online or offline, so that the product data are already available during production and detected correlations can be used directly for setting production parameters to achieve or maintain a predeterminable quality.

Claim 6 (previously presented). The method as claimed in claim 1, in which, after detection of certain correlations in the first or second data processing unit, production data or product data which do not show any correlations are filtered out and excluded from the further processing in the third data processing unit.

Claim 7 (previously presented). The method as claimed in claim 1, specific production data or product data being passed on in the first data processing unit or second data processing unit without prior analysis, filtering or processing to the

third data processing unit, to allow possible correlations with these unprocessed data to be found.

Claim 8 (currently amended). A device for setting process parameters of a production process in a production arrangement for an elongate sheet-like product to achieve a predeterminable quality, with the following features:

in the production arrangement there are a plurality of measuring transducers for process parameters of the production process, which are connected to at least a first data processing unit, in which the process data are processed and output as production data,

at least one surface inspection system in a stage of the production arrangement, which monitors the surface of the product and is connected to at least a second data processing unit, in which the surface is recorded as a surface map with established surface features in the form of surface data and the surface features are classified according to various types and/or according to size and/or according to frequency and are entered in the surface map according to their position, the various classes and positions of surface features being output as product data,

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the outputs of the first data processing unit and the second data processing unit are in connection with at least a third data processing unit with a correlation module, so that the production data and the product data can be investigated together for correlations existing between them, it being possible to establish rules as to how the product data depend on certain production data,

an output or visual display unit, from which the established correlations and/or rules can be output, so that the production parameters can be set in accordance with the desired product quality as a feedback to the production process.

Claim 9 (previously presented). The device as claimed in claim 8, wherein the production arrangement is a strip production arrangement, in particular a cast-rolling arrangement for steel strip.

Claim 10 (previously presented). The device as claimed in claim 8, wherein the surface inspection system is an arrangement having a plurality of sensors, in particular cameras, with a downstream image analysis system.

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Claim 11 (previously presented). The device as claimed in claim 8, wherein the correlation module contains for the investigation of correlations between production data and product data a correlation program which considers the entropy in the data space and detects correlations by finding data constellations with minimal entropy.

Claim 12 (previously presented). The device as claimed in claim 8, wherein the output of the third data processing unit is connected to closed-loop and open-loop control devices for the production process, to make possible an automatic or semiautomatic feedback and conversion of the correlation results into the production process.

Claim 13 (previously presented). The device as claimed in claim 8, wherein the first, second and third data processing units are arranged spatially apart from one another.

Claim 14 (previously presented). The device as claimed in claim 8, wherein the first, second and third data processing units are integrated into a common data processing center.